EPA proposes long-term cleanup at Barkhamsted-New Hartford Landfill Superfund Site

New England

The Cleanup Proposal...

After careful study of the groundwater, surface water, sediments, and soil at the Barkhamsted-New Hartford Landfill Superfund Site, and in consideration of the contaminant reduction accomplished by the early cleanup, the U.S. Environmental Protection Agency (EPA) proposes the following plan to address the remaining risks to human health and the environment from site contamination:

- ♦ Remediation of groundwater to interim cleanup levels by natural attenuation involving naturally occurring processes
- ! Installation of groundwater monitoring wells in the down gradient part of the plume
- ! Institutional controls, including environmental land use restrictions on present and future uses, and groundwater use restrictions
- ! Long term monitoring of groundwater, surface water, and sediment to evaluate changes over time and to evaluate the success of the remedial action
- ! 5 Year Review

Learn More about EPA's Proposed Plan at a public information session:

June 20, 2001 at 7:30p.m.
RRDD #1 Office Building Route 44
Pleasant Valley, CT

Find out about the proposed cleanup plan presented in this newsletter and how it compares with other cleanup options for the site. At the meeting, EPA will respond to your questions and concerns about the proposed cleanup and how it may affect you. For further information about this meeting, call Jim Murphy of EPA's Community Affairs office at (617) 918-1028, or toll-free at 1-888-372-7341.

What do you think?

Second Meeting:
Formal Public Comment Session
July 18, 2001 at 7:30 p.m.
RRDD#1 Office Building

EPA is accepting public comment on this cleanup proposal from June 20, 2001 through July 20, 2001. You do not have to be a technical expert to comment. If you have a concern or preference regarding EPA's proposed cleanup plan, then EPA and the CT Department of Environmental Protection want to hear from you before making a final decision on how to protect your community.

Page 8 of this plan describes various ways you can submit your comments during the 30 day public comment period. You do not have to be present at the public hearing to submit a formal comment.

A Closer Look at EPA's Cleanup Proposal...

The cleanup proposal for the Barkhamsted-New Hartford Landfill site involves the restoration of contaminated groundwater by monitored natural attenuation (MNA). Institutional controls will be used to restrict the future use of the site and prevent ingestion of groundwater. Groundwater contamination at the site, which includes volatile and semivolatile organic compounds and low concentrations of metals, constitutes a low-level threat. As a result of previous actions at the site, groundwater is the only medium requiring additional cleanup. All source materials and principal threats have been addressed through the landfill capping and related activity completed in 1999. EPA is proposing to rely on natural processes to reduce the concentration of contamination in the groundwater to state and federal drinking water standards. EPA estimates that these standards will be reached in approximately 16 years.

For the final cleanup program, EPA proposes to:

1. **Restore groundwater to interim cleanup levels** (see Table 1) **by natural attenuation involving naturally occurring processes within the groundwater.**

Monitored natural attenuation allows natural processes, including biodegradation and chemical stabilization, to reduce contaminant concentrations to acceptable levels. Monitored natural attenuation, while occurring naturally, is not a "do nothing" approach. It involves modeling, sampling and analysis, active monitoring, and evaluation of contaminant reduction rates. Sampling must continue throughout the time the process is used to confirm that contaminant reduction is proceeding at expected rates, and to ensure that contaminants continue to pose no risk to human health or the environment. By using monitored natural attenuation instead of constructing an active treatment facility, no remediation wastes are generated, fewer surface structures are required so there is less disruption to the community and ecological systems, and the remedy is less costly.

2. **Install groundwater monitoring wells in the down gradient part of the plume.**

The additional down gradient wells will be used in conjunction with the existing network of wells to track the progress of natural attenuation. Surface water and sediment sampling will also be conducted. Data collected as part of the monitoring program will be compared with criteria that will be established to measure the effectiveness of the natural attenuation remedy. The monitoring data will be used to verify that contaminant concentrations are not increasing in groundwater, surface water, or sediment. The monitoring data will also be used to confirm that the groundwater contaminant plume is not expanding, but is decreasing in size.

3. **Implement institutional controls including environmental land use restrictions on present and future uses, and groundwater use restrictions**.

Environmental land use restrictions will protect the landfill cap system and will prohibit groundwater use within, and in proximity to areas of groundwater contamination. The restrictions will also limit groundwater use in areas where the pumping of the groundwater could cause the contamination to migrate. The environmental land use restrictions will prevent any use of the landfill that would degrade the cap system.

4. **Perform long term monitoring of groundwater, surface water and sediment to evaluate change over time and to evaluate the success of the cleanup alternative.**

A comprehensive groundwater, surface water, and sediment monitoring program will be put in place until cleanup levels are reached at the site.

5. **Conduct Five Year Reviews**

EPA will make a determination of the protectiveness of the completed remedy every five years. EPA will also evaluate the progress and effectiveness of the cleanup after each five year period, and will make changes as necessary.

Background

The Barkhamsted-New Hartford Landfill, is located adjacent to and southwest of Route 44 within the Towns of Barkhamsted and New Hartford, Connecticut. The Site is on a 97.8 acres parcel of land on the northern slope of a hill within the Farmington River Valley in the north central portion of Connecticut, approximately 20 miles northwest of Hartford. The landfill is bordered on the northeast by the Barkhamsted Town Garage facility. The remainder of the parcel is bounded by a combination of developed and undeveloped private property. Residences with private drinking wells border the Site.

A portion of the Site was used as a landfill, owned and operated by the Regional Refuse Disposal District #1 (RRDD#1). The landfill operation consisted of non-processible and bulky waste disposal, community recycling collection, and yard waste composting. There is one surface water body, the Unnamed Brook, which originates south of the site, and flows north along the west side of the landfill area. The brook flows northeast on-site, under Route 44, where it enters the Farmington River floodplain and a series of small beaver ponds, and eventually enters the Farmington River, 0.25 miles southeast of the Site.

Site History

1970	Towns form Regional Refuse Disposal District #1 (RRDD#1)
1972:	CT DEP issues solid waste permit
1974–88:	Site receives municipal solid waste and some industrial waste
1980-83:	Contamination found, on-site well closes
1986-87:	Contaminants found in groundwater, leachate Metals found in landfill
1988-93:	Site accepts only bulky waste
1989:	Site on National Priorities List
1992:	RemedialInvestigation / feasibility study begin
1993:	Disposal function ends Recycling, bulky transfer continue
1994:	EPA asks for landfill cap study
1996:	Final RI is approved EPA receives cap design CT DEP agrees to pay landfill capping costs and oversee construction
1997:	Landfill cap construction begins
1999:	Landfill cap completed
2001:	Feasibility Study completed

Scope and Role of EPA's Proposed Long-Term Cleanup Program

The proposed cleanup plan described in this document is intended to be the final cleanup action at the Barkhamsted-New Hartford Landfill Superfund Site **(See Figure 1: *Site Location Map*).** This second and final cleanup action - also called the *Long-Term Site Cleanup, or Remedial Action* - is presented in this document for public review and comment. Both the early cleanup and the proposed long-term cleanup are discussed next.

Phase 1: Early Cleanup

The first phase of the landfill cleanup program - known as a *Non-Time Critical Removal Action (NTCRA), or early cleanup* - was performed by the Regional Refuse Disposal District #1 under Connecticut Department of Environmental Protection supervision from 1997 to 1999 through an agreement with EPA.

The purpose of the early cleanup was to minimize future potential impacts to human health and the environment by controlling the contaminated landfill source area. The secondary objective was to minimize the migration of any contaminated groundwater, sediments, and soils away from the landfill.

The NTCRA accomplished the following cleanup tasks:

1. Relocation of contaminated soil, sediment, and refuse to within the limits of the area to be capped

2. Installation of a leachate collection system

3. Installation of a 15,000 gallon double walled underground leachate storage tank

4. Capping of the landfill with a low permeability capping system

5. Relocation of an existing stream

6. Vertical extension of active groundwater monitoring wells located within the limits of the capped area, and abandonment of monitoring wells no longer being used

7. Site restoration

8. Installation of perimeter security fencing

EPA proposed this early cleanup for the Barkhamsted- New Hartford Landfill Superfund Site in December, 1994. The cleanup proposal was presented to the public for comment from December 15, 1994 through January 15, 1995. On January 11, 1995, EPA held a public hearing to receive public comments, and officially selected the proposed early cleanup for contaminated soils on January 19, 1996.

Phase 2: Long-Term Site Cleanup (Remedial Action)

The second phase, or long-term site cleanup (officially referred to as the Remedial Action), addresses all remaining areas of contamination at the Barkhamsted-New Hartford Landfill Superfund Site. It is the culmination of a ten year site investigation program, which has identified and evaluated the extent and nature of contamination at the site. The Remedial Action will build upon the success of the early cleanup program, and will address the entire site.

As described on page 2, EPA's proposal for the Phase 2 cleanup would address groundwater as well as long-term monitoring of surface water, sediments, and groundwater. This proposed long-term cleanup action is based on the results of the remedial investigation (RI) program, which was completed in 1996, and is described next.

Glossary

adsorption - to attach by physical or chemical means

downgradient - the area toward which groundwater flows.

extraction well - a well where water is pumped out in order to treat the water and to redirect groundwater movement.

groundwater - the supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs.

groundwater plume - a body of groundwater containing contaminants exceeding safe drinking water standards as defined by multiple samples from multiple wells.

inorganic - material not containing the element carbon (e.g. metals such as iron).

institutional controls - non-engineering measures which reduce or eliminate exposures such as deed restrictions or land use restrictions.

MCLs (maximum contaminant levels) - the maximum concentration of a given contaminant allowed in drinking water under state and federal regulations

monitored natural attenuation (MNA) - long term performance monitoring of groundwater and/or surface water conducted to ensure that natural attenuation (breakdown of contaminants through natural physical, chemical, and biological processes) is restoring groundwater quality as expected.

monitoring well - a well from which water level and water quality data is collected.

organics - a series of chemical containing carbon compounds.

semivolatile organic compounds (SVOCs) - organic compounds that do not evaporate readily to the atmosphere.

volatile organic compounds (VOCs) - organic chemical compounds that evaporate readily to the atmosphere. For example, benzene is a VOC found in gasoline that can be emitted into the atmosphere when gasoline evaporates. VOCs are also used in paints, plastics, solvents, and other products.

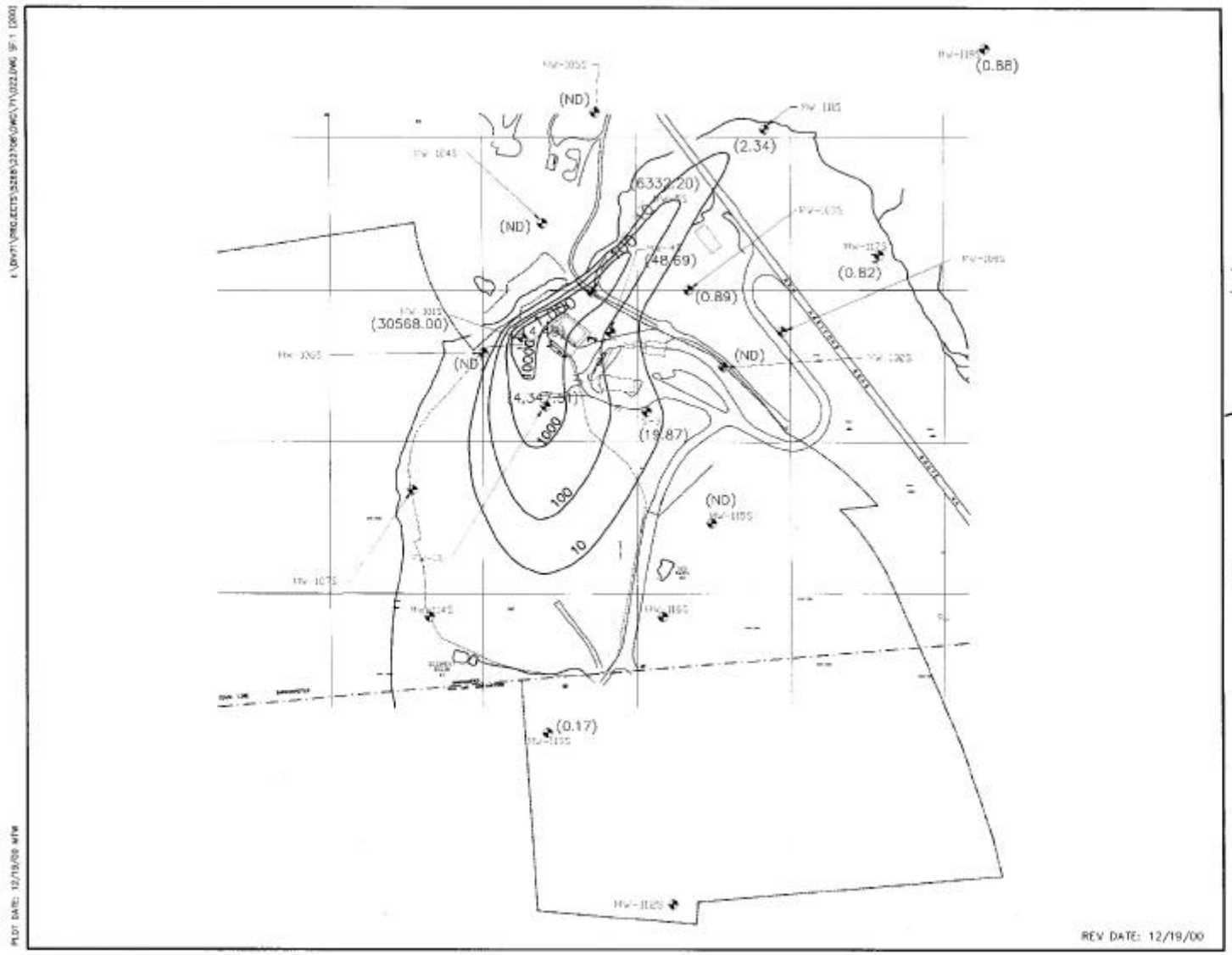


FIGURE 1-8

LEGEND

- RRDD#1 PROPERTY LINE
- TOWN LINE
- MW-5S MONITORING WELL LOCATION
- (2.34) TOTAL VOC CONCENTRATION IN (ug/L)
- 100 ISOCONCENTRATION (ug/L) (DASHED WHERE INFERRED)

BARKHAMSTED-NEW HARTFORD LANDFILL SUPERFUND SITE
BARKHAMSTED, CONNECTICUT

OVERBURDEN GROUND WATER PLUME MAP TOTAL VOCs (ug/L) (FEBRUARY 2000)

300 0 300
SCALE IN FEET

DATE: DECEMBER 2000
FILE NO. 5268.22708.022

O'BRIEN & GERE ENGINEERS, INC.

PLOT DATE: 12/19/00 MTW

Remedial Investigation Program (1991 - 1996)

During the five year period, EPA and Connecticut DEP provided oversight of a series of investigations designed to define the nature and extent of contamination at the Site. This investigation program is called a remedial investigation (RI).

What environmental work was accomplished?

The purpose of the remedial investigation program was to identify, evaluate, and characterize contamination in the groundwater, sediments, soils, surface water, and wastes at the Barkhamsted-New Hartford Landfill.

Groundwater

Prior to the remedial investigation, 31 monitoring wells were installed at the site to sample groundwater and monitor water levels. An additional 22 monitoring wells were installed during the remedial investigation. In order to characterize the vertical extent of contamination, wells were installed in the overburden (upper level of groundwater) and at three depths in the bedrock: shallow, intermediate, and deep. In most cases, the wells were installed as multi-depth clusters and were located up gradient, cross-gradient, and down gradient of the landfill.

Two rounds of samples were collected from the monitoring wells during the RI. All of the wells were sampled in the first round, and all but three clusters were sampled in the second round. Samples were analyzed for volatile organics (VOCs), semi-volatile organics (SVOCs), pesticides, PCBs, and metals.

In additional to the monitoring wells, ten domestic water supply wells to the north an east of the site were identified for sampling. The samples from these wells were analyzed for the same parameters as the monitoring wells.

Since the completion of the RI, additional rounds of groundwater sampling have been conducted. Not all of the original RI wells have been sampled in the subsequent rounds since some wells were abandoned during the land fill cap system construction. Most recently, samples were collected in December 1999 and February 2000 to update the risk assessment, to confirm the extent of the plume, and to estimate the extent to which natural attenuation is occurring.

Soil

During the RI, soil samples were collected both to determine the nature and extent of contamination and to conduct a risk assessment. Following preliminary investigations, 24 surface soil samples were collected within the limits of refuse, around the perimeter of the landfill, at upgradient (background) locations, and in a residential area along US Route 44. Deeper soil samples were also collected at 32 locations where borings were drilled to define the nature and extent of soil contamination. The final investigation related to delineation of the sources of contamination was the excavation of 29 test pits to define the limits of refuse around the landfill periphery.

Surface Water and Sediment

Surface water and sediment samples were collected at 16 locations upstream, downstream, and proximal to the landfill. In addition, leachate and sediment samples were collected at 12 leachate seeps that were located during the RI. Most of the seeps had an ultimate discharge point of the Unnamed Brook, where they were suspected to be affecting water and sediment quality.

What contamination did the Remedial Investigation program identify?

Soil

Generally, contaminants in the surface soil samples, where found, were present at concentrations below the standards of the Connecticut Remediation Regulations, except in known waste disposal locations. Similarly, the occurrence of contaminants in the deeper soil samples was also found to be highly correlated with the presence of waste. As a result of these investigations, a number of contaminants of potential concern (COPCs) were identified in the soil, based upon the unacceptable risks that they posed. Based on the results of the soil investigations, the limits of the landfilled waste

were delineated in anticipation of the design of the cap that would cover them.

Surface Water and Sediment

Downstream surface water samples contained generally low concentrations of most site-related contaminants. Metals were found to represent the most significant impact of the landfill on surface water. Downstream sediment samples contained numerous contaminants, including low concentrations of several pesticides and metals at concentrations that were up to an order of magnitude above background results.

Samples of the discharge from the seeps contained significant concentrations of contaminants. The leachate seeps were determined to be directly affecting water quality in the Unnamed Brook. The sediment samples from the locations of the leachate seeps also contained numerous contaminants

Groundwater

COPCs for groundwater include 14 VOCs, four SVOCs, and four inorganics. The COPCs were selected from the constituents detected in groundwater based on the unacceptable risks that those contaminants present.

A plume of contaminated groundwater flows from beneath the northeastern side of the landfill. Some of the plume discharges to the Unnamed Brook, while the remainder migrates in a northeasterly direction beyond Route 44 and into the flood plain of the Farmington River. See Figure 1-8.

The plume is generally about 300 feet wide. Since the bulk of the plume migrates within the overburden and the shallow bedrock aquifers, the vertical extent of the plume is generally between 10 and 50 feet below the ground surface. Lesser concentrations of contaminants occur in wells in the deep bedrock aquifer, at depths of about 200 feet.

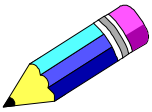
Where to go .....For More Detailed Information

To help you understand and comment on EPA's proposed cleanup plan for the Barkhamsted-New Hartford Landfill Superfund Site, all of the technical and public information publications prepared to date for the site are available for public review at the following locations:

Beardsley & Memorial Library
690 Main Street
Winsted, Connecticut 06098
(860) 379-6043
Hours:
Tues. - Thurs.: 10:30 a.m. - 8 p.m.
Friday: 10:30 a.m. to 4 p.m.;
Saturday: 10 a.m. to 2 p.m.

EPA Records Center
1 Congress Street, Suite 1100
Boston, MA 02114-2023
(617) 918-1453
Hours: 10 a.m.-noon
2 p.m.-5 p.m.

For general Superfund information: www.epa.gov/superfund



How Can You Comment?

During the 30-day public comment period from **June 20, 2001 to July 20, 2001**, EPA will accept formal written comments and hold a public hearing. EPA uses this public input to improve the cleanup proposal.

To make a **formal** comment you need only speak during the public hearing on **July 18, 2001**, or submit a written comment by **July 20, 2001**

While EPA considers input from the community throughout site investigations and cleanup, **EPA is required to respond in writing to all significant formal comments regarding the proposed cleanup plan that are submitted during the public comment period.**

Upon completion of the formal comment portion of the public hearing on **July 18, 2001**, EPA will discuss the cleanup proposal with meeting participants and answer questions.

EPA will review the transcript of all formal comments received at the hearing and all written comments received during the formal comment period before making a final cleanup decision. EPA will then prepare a written response to all significant formal written and oral comments.

Your input and ideas will become part of the official public record. The transcript of comments and EPA's written responses will be issued in a document called a ***Responsiveness Summary*** when EPA releases the final cleanup decision. Once complete, the Responsiveness Summary will be available at the Barkhamsted Public Library for review.

The Nine Criteria for Choosing a Cleanup

EPA uses nine criteria to balance the pros and cons of cleanup alternatives. EPA has already evaluated how well each of the cleanup alternatives developed for the Barkhamsted-New Hartford Landfill Superfund Site meet these criteria. Once comments from the state and the community are received, EPA will select a final cleanup plan for the Site.

(1) Overall protection of human health and the environment: Will it protect you and the plant and animal life on and near the site? EPA will not choose a plan that does not meet this basic criterion.

(2) Compliance with Applicable or Relevant and Appropriate Requirements (ARARs): Does the alternative meet all federal and state environmental statutes, regulations and requirements on-site?

(3) Long-term effectiveness and permanence: Will the effects of the cleanup plan last or could contamination cause future risk?

(4) Reduction of toxicity, mobility or volume through treatment: Does the alternative reduce the harmful effects of the contaminants, the spread of contaminants, and the amount of contaminated material?

(5) Short-term effectiveness: How soon will site risks be adequately reduced? Could the cleanup cause short-term hazards to workers, residents or the environment?

(6) Implementability: Is the alternative technically and administratively feasible? Are the right goods and services (i.e. treatment machinery; space at an approved disposal facility) available for the plan?

(7) Cost: What is the total cost of an alternative over time? EPA must find a plan that gives necessary protection for a reasonable cost.

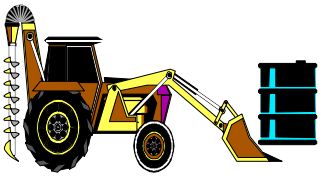
(8 & 9) EPA also strongly considers state and community input prior to finalizing the selection of the cleanup alternative.

Four Kinds of Cleanup

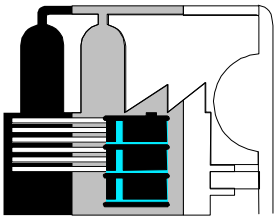
EPA examines numerous technical approaches to determine the best way to reduce the risks presented by a Superfund site. Reducing risk to human health and the environment often involves combinations of highly technical processes. **There are four basic cleanup options:**

Take limited or no action: Leave the site as it is, or restrict access to the site and monitor the contamination.

Contain contamination: Leave contamination where it is and cover or contain it to prevent exposure to, or spread of contaminants. This method reduces risks from exposure to contamination, but does not destroy or reduce it.



Move contamination off-site: Remove contaminated material (soil, groundwater, etc.) and dispose of it or treat it elsewhere.



Treat contamination on-site: Use a chemical or physical process on-site to destroy or remove the contaminants. Treated material can be left on-site. Contaminants captured by the treatment process are disposed of at an off-site hazardous waste facility.

Cleanup alternatives evaluated for the Barkhamsted-New Hartford Landfill Site

The Barkhamsted-New Hartford Landfill Feasibility Study Report describes all of the cleanup options that EPA considered in addressing groundwater contamination at the Site, as well as EPA's proposed cleanup plan. The options, referred to as "cleanup alternatives," are different combinations of plans to **either restrict access to the site, or contain**, **move**, or **treat** the contamination to protect public health and the environment.

EPA typically develops separate sets of options to deal with soil and waste contamination (the source of contamination at the site) and groundwater contamination (which may allow contamination to spread away from the site). As a result of the effective early cleanup, additional cleanup options for soil or landfill wastes were determined to be unnecessary.

In addition, during the Feasibility Study, EPA did not evaluate specific cleanup options with respect to surface water or sediments adjacent to the capped landfill. The Human Health Risk Assessment and Ecological Risk Assessment did conclude that some risk to certain animals was associated with exposure to pesticides in the brook sediments; however, prior to capping the contaminated sediments were excavated and placed in the landfill, eliminating the risk. As previously mentioned, groundwater contamination was identified as the only aspect of the Site that was not completely addressed by the early cleanup and needed further action. However, monitoring of the sediments and surface water was considered a necessary component of any cleanup action based upon the presence of elevated levels of pesticides in the sediment.

Remedial Action Objectives:
Based upon the results of the remedial investigation and the Human Health and Ecological Risk Assessments, EPA identified the following cleanup objectives to serve as the basis for developing potential remedial alternatives:

- Prevent the ingestion of groundwater containing contaminants that exceed federal or state maximum contaminant levels (MCLs), CT Remediation Standards, or in their absence, an excess cancer risk of 1×10^{-6} "one in a million" or a hazard quotient of 1;

- Restore groundwater beyond the compliance boundary (limits of the landfill) to meet federal or state maximum contaminant levels (MCLs), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1; and

- Protect aquatic organisms from direct contact with or ingestion of, surface water having contamination exceeding federal ambient Water Quality Standards, CT Water Quality Standards, or in their absence, a hazard quotient of 1.

During the upcoming 30-day public comment period from **June 20, 2001** to **July 20, 2001**, EPA welcomes your comments on this proposed cleanup plan as well as the other technical approaches EPA evaluated. These technical alternatives are summarized below.

Please consult the Barkhamsted-New Hartford Landfill Site Feasibility Study, available at the Barkhamsted Public Library, for more detailed information.

W*hy is cleanup needed?*

Previous remedial activities at the Barkhamsted-New Hartford Landfill Superfund site included consolidation of the landfill contents and contaminated stream sediments under an low permeability cap and leachate collection. Prior to capping, landfill contents had contaminated groundwater, and leachate had contaminated surface water and sediment of an Unnamed Brook bordering the landfill. The most contaminated sediments were removed and placed on the landfill prior to capping. Since infiltration of precipitation has been largely eliminated, it is expected that the leachate seeps will eventually dry up and cease to be a source of surface water contamination. Recent sampling (December 1999, February 2000) showed that no constituents exceeded the surface water criteria.
Capping with low permeability material was conducted to minimize infiltration of precipitation into the landfill contents and subsequent transport

of chemicals to groundwater and leachate. Capping also prevented direct exposure of people and wildlife to contaminated Site soil. Contaminants have migrated into the groundwater system so exposure to water from wells that intercept the plume is the only remaining potential route of human exposure. Residential and institutional properties that surround the Site obtain their water from individual supply wells which are not known to be affected by contaminants from the site. However, if public or private supply wells were installed within or near the plume in the future, contaminants from the site could affect them.

The chemicals in groundwater that could harm human health from frequent or long-term exposure are listed in Table 1 where the maximum concentrations are compared with interim cleanup levels. Interim cleanup levels for inorganics are currently based on background. The organic interim cleanup levels were approved by EPA on October 19, 2000.

Proposed Cleanup Levels

Based upon the results of the Human Health and Ecological Risk Assessments for the Site, EPA has developed a list of contaminants which represent an unacceptable threat to human health and/or the environment. As part of the development of the Feasibility Study, EPA established numerical cleanup levels as the standards that must be met for a cleanup action to be considered acceptable. The interim cleanup levels for the Barkhamsted-New Hartford Landfill Superfund Site are presented in Table 1.

Cleanup levels will be considered to have been achieved when concentrations of the contaminants of concern have met the cleanup levels for a sustained period of at least 3 years. At the time when cleanup levels are met, the groundwater shall be sampled to determine if any other constituents are present that represent a threat to human health and the environment or which exceed any federal or state drinking water standards. EPA may update the cleanup levels at that time if determined necessary to protect human health and the environment.

Table 1: Interim Groundwater Cleanup Levels

Table 1 Maximum Levels of Contaminants Found On-Site Compared to Acceptable Connecticut and Federal Levels and Interim Cleanup Levels

Site Contaminants of Concern in the Groundwater - Chemicals of Concern (COC)	Maximum Conc. found on Site (ug/l)	Federal Maximum Contaminant Level (ug/l)	Interim Cleanup Level (ug/l)
Carcinogenic COCs			
Arsenic	22	50	5.0
1,4-dichlorobenzene	4.3	75	<10.0
Benzene	17	5	<0.5
1,2-dichloroethane	4.4	5	<0.5
1,2-dichloropropane	2.2	5	<0.5
Chloroethane	16	NA	<1.0
Chloroform	0.43	NA	<0.5
Chloromethane	2.3	NA	<1.0
Dibromochloromethane	0.78	NA	<0.5
Methylene chloride	110	NA	<2.0
Trichloroethene	4.3	5	<0.5
Vinyl chloride	1.9	2	<1.0
Bis(2-ethylhexyl) phthalate	65	6	<2.0
Noncarcinogenic COCs			
Chromium(total)	220	100	50.0
Lead	42	15 (Action Level)	3.0
Manganese	8100	NA	50.0
Acetone	18000	NA	<10.0
2-butanone	37000	NA	<10.0
4-methyl-2-pentanone	2200	NA	<5.0
Toluene	23000	1000	<0.5
2,4-dimethylphenol	2200	NA	<10.0
4-methylphenol	51000	NA	<10.0

Note: The interim cleanup level established for each chemical is the background concentration. Further information on chemicals of concern can be found in the Feasibility Study.

Cleanup Alternatives Considered

Note: The four alternatives selected for detailed analysis in the Feasibility Study are called "management of migration" alternatives and are referred to as MM-1, MM-2 , MM-3A, and MM-3B. The management of migration alternatives address contamination that has migrated into and with the groundwater from the original source of contamination. Each alternative is described more fully in Section 3 of the Feasibility Study available for review at the library in Barkhamsted.

Alternative MM-1:

No Action

This alternative would not include additional work beyond the early cleanup. EPA would leave the site as it is, and no efforts would be made to control the migration of the contaminants in groundwater or to restore the aquifer.

The No Action alternative would not, in and of itself, treat, remove, or actively reduce the potential exposure risk to contaminated groundwater, soil, and/or sediments on-site.

This alternative would not include environmental land use restrictions or public education.

The No-Action alternative would include an EPA mandated environmental monitoring program for groundwater, surface water and sediment, to be performed every five years for at least 30 years.

Estimated cost: (required monitoring): $16,900
Estimated Present Worth: $242,080 (assuming 30 years at 7% discount rate)

Alternative MM-2

Management/Natural Attenuation

(EPA preferred alternative, see page 2 for more details)

This alternative would rely upon natural degradation and dilution processes to cause the levels of contamination to drop below the interim cleanup levels specified in Table 1. Long-term monitoring would include the installation of additional monitoring wells and periodic sampling and analysis of the groundwater, surface water, and sediment to evaluate changes over time. Land use restrictions involve placing legal restrictions on present and future uses. A public education program would involve informational meetings and/or mailings to discuss potential Site hazards.

An evaluation of natural attenuation conducted in accordance with USEPA protocols indicates that the contaminant plume is attenuating naturally. A review of historical groundwater quality data indicates that the concentrations of site- related constituents are either remaining stable or decreasing over time. Elimination of the source of groundwater contaminants by completion of the NTCRA in November 1998 shows further decreases in contaminant concentrations. Evidence of degradation is supported by the presence of contaminant breakdown products.

Environmental land use restrictions would prevent residential use of the Site, prevent contaminated groundwater from being extracted for use, and avoid disturbance of the landfill cap. Additional environmental land use restrictions of down gradient properties would prohibit consumption of groundwater**.**

Education of the public relative to the conditions at, and related to, the Site would be performed via public meetings and/or written documentation.

Site conditions with implementation of natural attenuation would eventually be consistent with applicable federal and state chemical-specific standards. Groundwater modeling conducted during the FS showed that natural attenuation will achieve the interim groundwater cleanup levels, in the overburden in approximately 15.6 years and in the bedrock aquifer in approximately 6 years.

This alternative would include an EPA mandated environmental monitoring program for groundwater, surface water and sediment, to be performed every five years for at least 30 years.

Estimated Capital Cost: $147,000
Estimated Annual O&M Costs: $82,000
Estimated Present Worth: $945,392 to $1,196,909 (16 to 30 years)
Estimated Time: 15.6 years

Alternative MM-3A

Collection, Treatment (includes air stripping and carbon adsorption), and Discharge of Groundwater

Alternative MM-3A includes and builds upon MM-2 (as it includes monitoring, environmental land use restrictions and public education. This alternative also consists of the installation of *extraction wells*; on-site treatment of groundwater collected in the wells via filtration, chemical precipitation, neutralization, air stripping, and carbon adsorption; and discharge of treated groundwater to the Unnamed Brook. (The treatment technologies are described in detail in Section 2.4.1. of the FS). The goal of this alternative would be to restore the aquifer more quickly. The Feasibility Study evaluated this alternative by computer simulation of a system of 14 extraction wells that would intercept and capture the contaminated groundwater. The proposed treatment technologies would address the primary contaminants of concern, and the treated water would be discharged into the Unnamed Brook in accordance with state and federal regulations. For MM-3A, groundwater would achieve the interim cleanup levels in the shallow aquifer in approximately 13.2 years and in the bedrock aquifer in approximately 4.9 years.

This alternative would include an EPA mandated environmental monitoring program for groundwater, surface water and sediment, to be performed every five years for at least 30 years.

Estimated Capital Cost: $1,514,080
Estimated Annual O&M Costs: $244,800
Estimated Present Worth: $3,673,291 - $4,584,181 (14 to 30 years)
Estimated Time: 14.2 years

Alternative MM-3B

Collection, Treatment (including UV oxidation) and Discharge of Groundwater

Alternative MM-3B also builds upon MM-2 (as it includes monitoring, environmental land use restrictions and public education - all described on page 2) and is very similar to MM-3A, with the exception of the use of ultraviolet (UV) oxidation in lieu of air stripping and carbon adsorption. The goal of this alternative would again be to restore the aquifer more quickly than MM-2. The Feasibility Study evaluated this alternative with the same scenario of extraction wells as in MM-3. Ultraviolet oxidation is a process which utilizes UV radiation in combination with an oxidizer such as peroxide or ozone to destroy hazardous chemicals in a liquid solution. The combined treatment technologies would address the primary contaminants of concern, and the treated water would be discharged into the Unnamed Brook in accordance with state and federal regulations. For MM-3B, groundwater would achieve the interim cleanup levels in the shallow aquifer in approximately 13.2 years and in the bedrock aquifer in approximately 4.9 years - the same time frame as MM-3A at a slightly higher cost.

This alternative would include an EPA mandated environmental monitoring program for groundwater, surface water and sediment, to be performed every five years for at least 30 years.

Estimated Capital Cost: $1,572,880
Estimated Annual O&M Costs: $245,800
Estimated Present Worth: $3,819,545 - $4,767,071 (4 to 30 years)
Estimated Time: 14.2 years including 1 year for construction

Comparison of Alternatives

(See Table 2 for a summary of the comparative analysis).

For an alternative to be considered acceptable, it must meet the two threshold criteria: (1) Protective of Human Health and the Environment; (2) Comply with all Relevant and Appropriate state and federal statutes and regulations. Alternative MM-1 -- *No Further Action*, does not meet these threshold criteria because elevated levels of contamination exist at the site. Since this alternative would not be protective of human health and the environment, it could not be selected as a cleanup option. MM-2, MM-3A, and MM-3B provide better protection than MM-1 since they include environmental land use restrictions and public education that would prevent contact with, and ingestion of, groundwater.

MM-2, MM-3A, and MM-3B all met the threshold criteria. Therefore, the preferred alternative was selected from these three alternatives based upon the best balance of the 5 balancing criteria.

Long-Term Effectiveness and Permanence

Each alternative, except the No Action alternative, provides some degree of long-term protectiveness through environmental land use restrictions and public education. Monitoring activities associated with all four alternatives are adequate and reliable.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Each of the four alternatives would address the contaminants of concern in groundwater and would decrease toxicity and volume of the contaminants by reducing contaminant concentrations in the groundwater to the interim cleanup levels, either by natural attenuation by naturally occurring in-situ processes or by groundwater extraction and treatment. The significant difference between alternatives is that there would be no active treatment plant and associated residuals with MM-1 and MM-2.

Short-Term Effectiveness

For all four alternatives, the community is restricted from access to the Site via the existing fencing. For alternatives MM-2, MM-3A, and MM-3B the environmental land use restrictions will prohibit disturbance of the landfill cap and use of groundwater. Groundwater, surface water and sediment monitoring will not affect the community. Since alternatives MM-3A and MM-3B involve construction activities, inhalation of dust and vapors, and direct contact with groundwater could cause significantly more risk to workers if MM-3A and MM-3B were implemented than if MM-1 and MM-2 were implemented.

No environmental or construction impacts are identified for implementation of MM-1 and MM-2. Alternatives MM-3A and MM-3B could pose an impact to the construction workers and the environment by contaminant transport during construction.

Implementability

The technical feasibility and associated monitoring of all alternatives are equal. Installation of recovery wells and construction of the treatment technologies associated with MM-3A and MM-3B are readily implemented. Coordination with agencies other than USEPA and CTDEP would not be required for MM-1. Legal coordination with property owners and the town would be necessary to implement the environmental land use restrictions and public education program for MM-2, MM-3A, MM-3B. Permits for off-site disposal of residual materials and treated groundwater for MM-3A and MM-3B would be required and are obtainable.

Cost

The estimated present worth costs for each alternative are presented in ranges. The lower present worth cost is based on the estimated number of years that the alternative will require to achieve the interim groundwater cleanup levels in both the shallow and deep aquifers. The upper end of the range is based on 30 years in accordance with USEPA policy.

MM-1:	**$183,405**	**to**	**$242,080**
MM-2:	**$945,382**	**to**	**$1,196,909**
MM-3A:	**$3,673,291**	**to**	**$4,584,181**
MM-3B:	**$3,819,545**	**to**	**$4,767,071**

Alternative MM-1 is the least costly alternative. The cost to implement MM-2 is significantly less than the extraction and treatment alternatives (MM-3A and MM-3B) which are similar to each other. The increase in costs of alternatives MM-3A and MM-3B provide only a slight decrease in the time required to reduce toxicity, mobility, and volume compared to the other alternatives, based on groundwater modeling results.

Table 2
Comparison of Cleanup Alternatives

Nine Criteria	1 No Action	2 * Monitored Natural Attenuation	3 Groundwater extraction and treatment (including air stripping)	4 Groundwater extraction and treatment (including UV oxidation)
Protects human health and environment	C	A	A	A
Meets federal and State requirements	A	A	A	A
Provides long-term protection	C	A	A	A
Reduces mobility, toxicity and volume through treatment	C_1	C	A	A
Provides short-term protection	C	A	A	A
Implementable (Can it be done?)	A	A	A	A
Cost (millions)	$ 0.242	$ 0.945 to $ 1.2	$3.7 to $4.6	$3.8 to 4.8
Time to reach cleanup goal	15.6 years	15.6 years	14.2 years	14.2 years
State agency acceptance	To be determined after the public comment period			
Community acceptance	To be determined after the public comment period			

*** EPA's preferred alternative**
A Meets or exceeds criterion
B Partially meets criterion
C Does NOT meet criterion

1: Note: this Convenience Copy of the Official Record has been corrected to reflect the information provided at the Public Meeting.

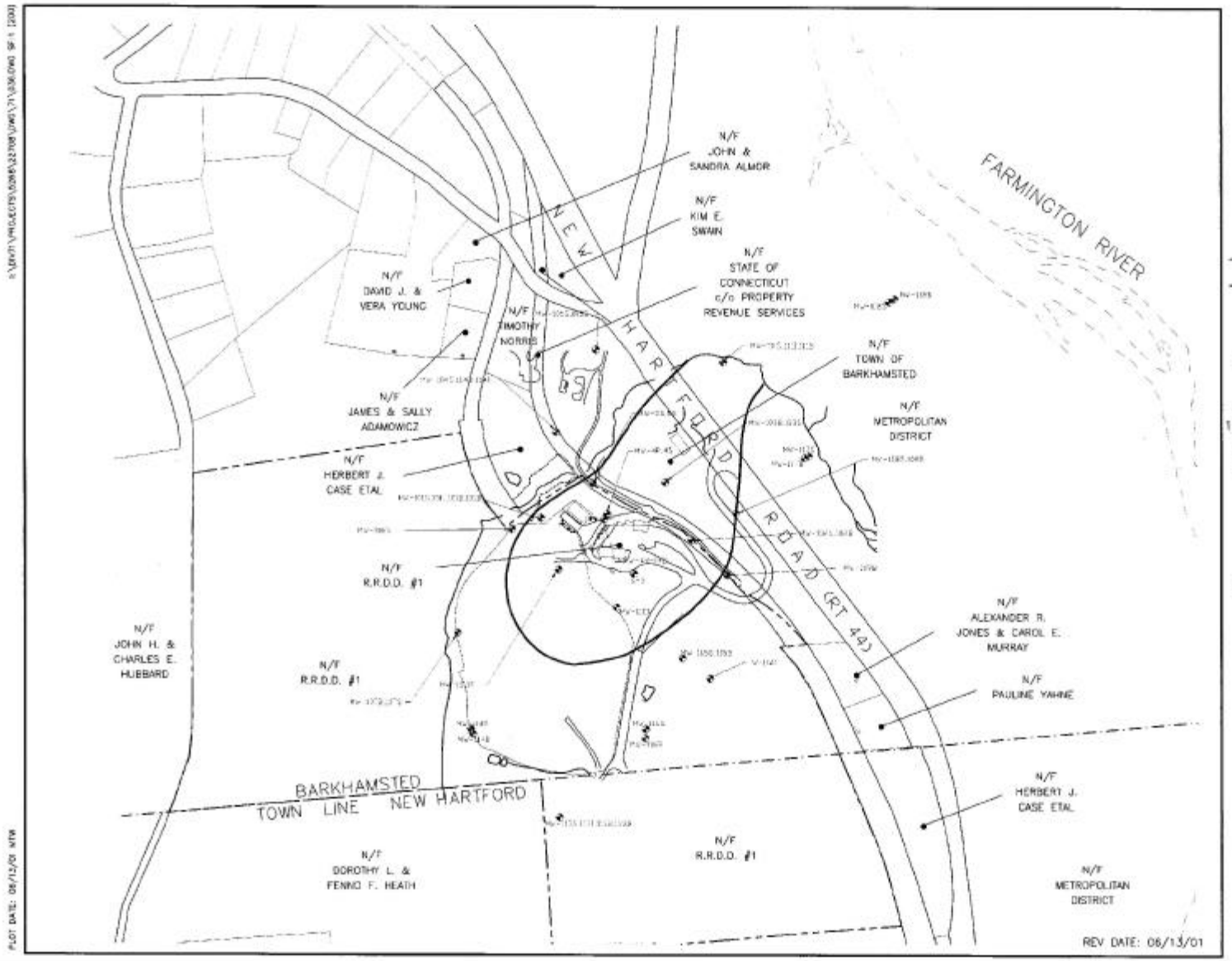


FIGURE 1–25

LEGEND

- RRDD#1 PROPERTY LINE
- TOWN LINE
- MONITORING WELL LOCATIONS
- EXTENT OF SHALLOW BEDROCK GROUND WATER PLUME

NOTES:
1. PROPERTY OWNER INFORMATION IS BASED UPON PLATE 12 OF THE LANDFILL SITE INVESTIGATION REPORT (FUSS & O'NEILL, INC.)

BARKHAMSTED–NEW HARTFORD LANDFILL SUPERFUND SITE
BARKHAMSTED, CONNECTICUT

PROPERTIES IMPACTED BY GROUND WATER PLUME

400 0 400
SCALE IN FEET

DATE: JUNE 2001
FILE NO. 5266.22708.036

O'BRIEN & GERE ENGINEERS INC.

Why Does EPA Recommend Monitored Natural Attenuation and Institutional Controls as a Long-Term Cleanup Plan for the Barkhamsted- New Hartford Landfill?

EPA recommends this cleanup plan as the best balance of public health and environmental protection with cost, effectiveness, and implementability. The cleanup plan described in this document would be the most cost effective approach to address the threats to human health and the environment. Natural processes appear to have the potential to reduce the concentration of contamination to acceptable levels. The institutional controls to be established by the responsible parties would successfully prevent current or future groundwater use and restrict land use at the site. Institutional controls shall be placed on properties impacted by the ground water plume (see Figure 1-25.)

In summary EPA recommends this proposed cleanup plan because, if implemented, the cleanup option would:

- **Be protective of public health and the environment and comply with applicable federal and state statutes, regulations, and requirements;**
- **Result in a permanent restoration of the groundwater;**
- **Include a monitoring program to periodically evaluate the success of the natural reduction of the contamination**
- **Provide the most cost-effective approach to cleaning up the site.**

Long-term monitoring of surface water, groundwater, and sediments would be performed until cleanup levels are attained.

Next Steps

In September 2001, EPA expects to have reviewed all comments and signed the Record of Decision (ROD) describing the chosen cleanup plan. The ROD and a summary of responses to public comments will then be made available to the public at the Beardsley & Memorial Library and through the EPA Records Center in Boston. EPA will announce the final decision to the community through the local news media and a general mailing.

Use This Space to Write Your Comments

or to be added to the mailing list

EPA encourages you to provide your written comments and ideas about the cleanup options under consideration for dealing with the contamination at the Barkhamsted-New Hartford Landfill Superfund Site. You can use the form below to send written comments. If you have questions about how to comment, please call *Jim Murphy of EPA's Community Affairs office at (617)918-1028.* Please mail this form or additional sheets of written comments, postmarked no later than July 20, 2001, to:

Byron Mah
Remedial Project Manager
U.S. Environmental Protection Agency
Region I, (HBT)
1 Congress Street, Suite 1100
Boston, MA 02114 - 2023
or E-Mail to : mah.byron@epa.gov

(Attach sheets as needed)

Comment Submitted by:

Mailing list additions, deletions or changes

If you did not receive this through the mail and would like to

be added to the site mailing list
note a change of address
be deleted from the mailing list

Name :_____
Address:_____
_____
_____

Please check the appropriate box and fill in the correct address information above.